

Engineering Joint Scaffolds for Concurrent Function and Regeneration

Goal: Engineer Mandibular Condyle

Replacement using optimally designed and fabricated scaffolds with stromal cell and/or gene delivery

Specific Aim 1: Optimally design and fabricate scaffolds to match minipig mandible stiffness while maintaining high porosity

Specific Aim 2: Fabricate designed scaffolds from HA, TCP, PGA, Polyanhydrides and discrete and/or blend composites thereof.

Specific Aim 3: Mechanically test fabricated scaffolds

Specific Aim 4&5: Test bone , cartilage and bone-cartilage interface regenerative capability of scaffolds

Specific Aim 6: Choosing the best scaffolds from Aim 3, 4 & 5 fabricate and implant minipig condyle scaffold

BRP Investigators:

Scott Hollister (UM) Comp Design; Biomaterial Fabrication

Paul Krebsbach (UM) Stromal Cell Biology; Gene Delivery

Steve Feinberg (UM) Clinician TMJ

Dave Kohn (UM) Exp Biomechanics

Kristi Anseth (Colorado) Biomaterials

Bob Guldberg (GTech) In Vivo models; biomechanics

BRP Consultants:

Jeffrey Hollinger (CMU) Bone Tissue Engineering

Steve Gordon (Osiris Therapeutics)

Susan Herring (Washington) TMJ Biomechanics

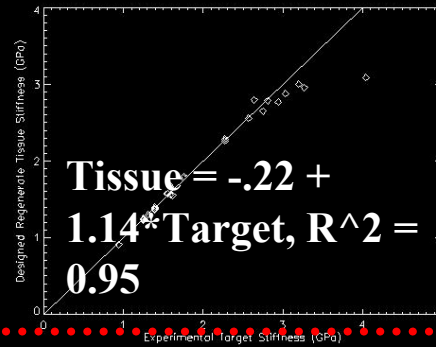
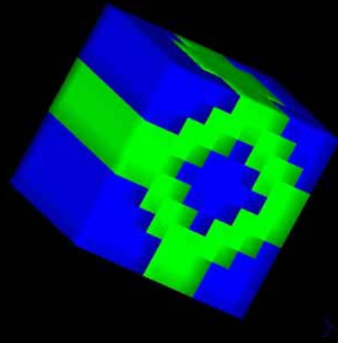
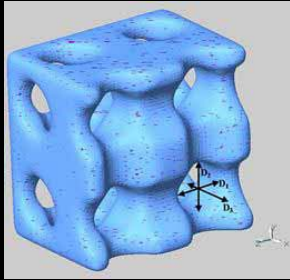
Stephen Milam (San Antonio) TMJ biochemistry/morphology

Louis Mercuri (Loyola Chicago) TMJ replacement clinician

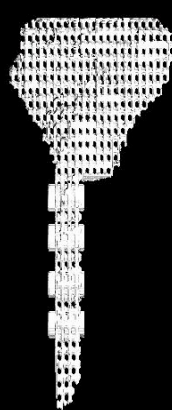
BRP management and coordination done over the web on a University of Michigan research collaboration site called UM Worktools: [http://worktools si.umich.edu](http://worktools.si.umich.edu)

Current Progress

Specific Aim 1: Finished Have optimally designed scaffolds & regenerate tissue to match native bone properties. Submitted *Biomaterials*



Specific Aim 6: Progress
Have shown capability to design/fabricate a mandibular condyle scaffold
Cells, Tissues, Organs 2001



Specific Aim 2: Significant progress Have fabricated HA, PLA, PGA and HA/PLA, HA/PGA composite designed scaffolds for interface regeneration

